

A Field Observation and Significant Range Extension of *Manouria impressa* in Myanmar

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Abstract Few records of the impressed tortoise (*Manouria impressa*) are available from Myanmar and most are based on historic accounts, old museum specimens, and shells obtained from villagers and wildlife traffickers. We herein report the observation of a living *M. impressa* in the Hukaung Valley Wildlife Sanctuary of northern Myanmar. Our observation extends the known distribution of *M. impressa* in Myanmar approximately 850 km northwards from previously reported populations in the Rakhine Hills of Magway Region.

Keywords conservation, Hukaung Valley Wildlife Sanctuary, impressed tortoise, Myanmar

The impressed tortoise (*Manouria impressa*) is a poorly-studied chelonian occurring from western Myanmar, eastwards to Thailand, Laos, Vietnam, Cambodia, and southern China, and south through Peninsular Malaysia (Iverson, 1992; Platt *et al.*, 2001; Stuart and Platt 2004). Within Myanmar, the geographic distribution of *M. impressa* remains ill-defined; previous records include upland regions in Kayah, Kayin, and Shan States, and Magway and Bago Regions (formerly Division) (Smith, 1931; Iverson, 1992; Platt *et al.*, 2001). However, with the exception of a living turtle captured by rural villagers in Shan State (Platt *et al.*, 2001), most records of *M. impressa* from Myanmar are based on historic accounts and old museum specimens (Smith, 1931; Iverson, 1992) or shells obtained from rural villagers and wildlife traffickers (Platt *et al.*, 2001). Field observations of living *M. impressa* from Myanmar and elsewhere within Southeast Asia are notable for their paucity in the published literature (Calame *et al.*, 2013; but see Chan-ard *et al.*, 1996). Herein we provide a recent field observation of *Manouria impressa* in Myanmar and comment on the significance of this record.

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This observation occurred in the Hukaung Valley Wildlife Sanctuary (HVWS) in Kachin State, Myanmar. HVWS encompasses 17,373 km² in northern Myanmar with elevations ranging from 94 to 3,440 m (Hla Naing *et al.*, 2015). Lowlands are dominated by a mosaic of broadleaf forest and grassland, while hill forests, evergreen open forests, and temperate forests (depending on elevation) characterize higher elevation habitats (Hla Naing *et al.*, 2015). On 22 May 2015 (ca. 1400 hr), one of us (SH) encountered an adult *Manouria impressa* (straight-line carapace length ca. 200 mm; Figure 1) along the Ledo Road between Namyun and Shinbweyan Villages (26.81345°N; 96.20468°E; India-Bangladesh datum). The tortoise was crossing the road (a dirt track) in an area of dense second-growth evergreen forest with an abundance of bamboo and ground cover at an elevation of 960 m in mountainous terrain (Figure 2). Heavy rains signaling the beginning of the annual monsoon (May through October) had fallen over the previous five days, perhaps triggering activity by the tortoise (e.g., Smart *et al.*, 2014). The tortoise was examined and photographed before being released into dense cover adjacent to the road. Voucher photographs (CUSC 2953) of the tortoise and habitat were later deposited in the Campbell Museum, Clemson University, Clemson, South Carolina, USA.

Our record extends the known distribution of *M. impressa* in Myanmar approximately 850 km northwards



Figure 1 *Manouria impressa* found crossing the Ledo Road in the Hukaung Valley Wildlife Sanctuary, Kachin State, Myanmar on 22 May 2015.



Figure 2 Second-growth evergreen forest (elevation = 960 m) where a *Manouria impressa* was found crossing the Ledo Road in Hukaung Valley Wildlife Sanctuary, Kachin State, Myanmar.

from previously reported populations in the eastern Rakhine (formerly Arakan) Hills of Magway Region (Platt *et al.*, 2001) (Figure 3). The distribution of *M. impressa* elsewhere in the uplands of western Myanmar remains unresolved. Platt *et al.* (2001) suggested *M. impressa* was likely present in the Chin and Naga Hills, contiguous mountainous terrain linking the Rakhine Hills with uplands in HVWS; however, surveys of this region have to date failed to confirm its occurrence (Platt *et al.*, 2012, 2013). Collectively, our observation and those of Platt *et al.* (2001) represent the western-most records in the global distribution of *M. impressa* (Iverson, 1992). We speculate that high north-south trending mountain ridges in western Myanmar act as biogeographic barriers to dispersal and probably define the distributional limit. Finally, our observation of *M. impressa* in an area of

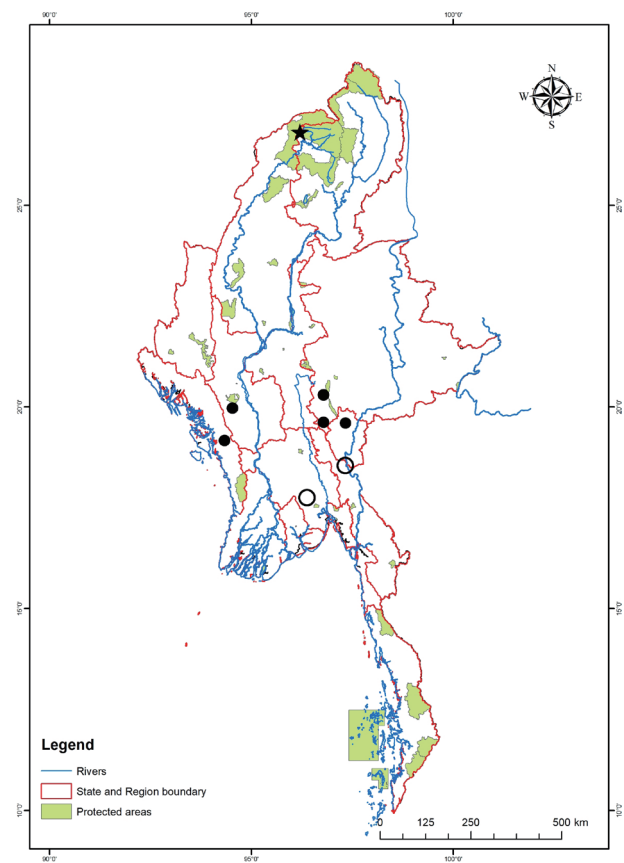


Figure 3 Map of Myanmar showing location where *Manouria impressa* was found in Hukaung Valley Wildlife Sanctuary (Star). Historic records (open circles) and more recent records (closed circles) from Iverson (1992) and Platt *et al.* (2001), respectively.

evergreen hill forests appears consistent with other reports describing the habitat of this tortoise (Chan-ard *et al.*, 1996; Calame *et al.*, 2013).

Manouria impressa is considered Vulnerable to extinction (<http://www.iucnredlist.org>) due to a combination of unsustainable subsistence harvesting, over-collecting for commercial wildlife markets in southern China, and widespread habitat destruction (Chan-ard *et al.*, 1996; Platt *et al.*, 2001; Calame *et al.*, 2013). Because *M. impressa* is extremely difficult to maintain and propagate in captivity, *in situ* protection of wild populations is the recommended conservation option (Horne *et al.*, 2012). Given its size, relatively low human population density, and widespread availability of suitable upland forest habitat (Hla Naing *et al.*, 2015), HVWS could play a vital role in future efforts to protect *M. impressa*, although political and civil instability in the region has curtailed conservation efforts for the moment.

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